

air over the United States and Canada is shown by the dotted isotherms on Chart II; the lines are drawn over the high irregular surface of the Rocky Mountain plateau, although the temperatures have not been reduced to sea level, and the isotherms, therefore, relate to the average surface of the country occupied by our observers; such isotherms are controlled largely by the local topography, and should be drawn and studied in connection with a contour map.

The *regular diurnal period* in temperature is shown by the hourly means given in Table IV for all stations having self-registers.

As compared with the normal for March, the mean temperatures for the current month were decidedly in excess in western Florida, parts of Texas, North and South Carolina, Wisconsin, Minnesota, North and South Dakota, and in a few scattered places in Washington, Oregon, and California. The greatest excesses were: Topeka, 4.7; Pierre, 3.8; Moorhead, 3.7; St. Vincent, 3.5.

Considered by districts, the mean temperatures for the current month show departures from normal temperatures as given in Table I. The greatest positive departure was North Dakota, 3.2; the greatest negative departure was for the Lower Lake region, 3.5.

The years of highest and lowest mean temperature for March are shown in Table I of the REVIEW for March, 1894. The mean temperature for March, 1895, was not the highest or lowest on record at any regular Weather Bureau station.

The maximum and minimum temperatures of the current month are given in Table I. The highest maximum was Yuma, 97; the lowest maximum, Eastport, 44. The highest minimum was Key West, 57; the lowest minimum, St. Vincent, 24.

The years of highest maximum and lowest minimum temperatures are given in the last four columns of Table I of the current REVIEW. During the present month the maximum temperatures were the highest on record in eastern Montana, North and South Dakota, Nebraska, Kansas, Iowa, Missouri, Arkansas, Illinois, Indiana, Ohio, Tennessee, Kentucky, northern Alabama, and Georgia. The minimum temperatures were the lowest on record at Concordia, Eureka, Astoria, and Olympia.

The greatest daily range of temperature and the extreme monthly range are given for each of the regular Weather Bureau stations in Table I, which also gives data from which may be computed the extreme monthly ranges for each station. The largest values among the greatest daily ranges were: Bismarck, 56; Concordia and Parkersburg, 50. The smallest values were: Tatoosh Island, 12; Key West, 13. Among the extreme monthly ranges the largest values were:

Concordia, 95; Bismarck, 94; Pierre, 92; North Platte, 91. The smallest values were: Tatoosh Island, 21; Key West, 24; Nantucket, 26; Port Angeles, Fort Canby, and Port Eads, 29; San Francisco and Block Island, 30.

The accumulated monthly departures from normal temperatures from January 1 to the end of the current month are given in the second column of the following table, and the average departures in the third column, for comparison with the departures of current conditions of vegetation from the normal conditions.

Districts.	Accumulated departures.		Districts.	Accumulated departures.	
	Total.	Average.		Total.	Average.
North Dakota	0	0	New England.....	-4.6	-1.5
Northern plateau	+1.5	+0.5	Middle Atlantic.....	-12.0	-4.0
North Pacific.....	+9.5	+3.2	South Atlantic.....	-14.1	-4.7
Middle Pacific.....	+2.4	+0.8	Key West.....	-9.5	-3.2
Southern Pacific.....	+0.3	+0.1	East Gulf.....	-15.0	-5.0
	+0.1	0.0	West Gulf.....	-12.0	-4.2
			Ohio Valley and Tenn....	-17.0	-5.7
			Lower Lake.....	-14.1	-4.7
			Upper Lake.....	-8.5	-2.8
			Upper Mississippi.....	-10.3	-3.4
			Missouri Valley.....	-3.6	-1.2
			Northern slope.....	-4.8	-1.6
			Middle slope.....	-6.4	-2.1
			Southern slope (Ablene).....	-14.1	-4.7
			Southern plateau.....	-2.1	-0.7
			Middle plateau.....	-4.5	-1.5

The limit of freezing weather is shown on Chart VI by the isotherm of minimum 32° and the limit of frost by the isotherm of minimum 40°.

Frosts were reported on the mornings of the 14th, 15th, and 16th, throughout the portion of California situated on the western slope of the Sierra Nevada, and especially the northern portions. In some places this frost was preceded by a hail-storm on the 13th. Great damage was done to the vegetation, especially because the warm weather of February had brought it forward more rapidly than usual. The cold wave swept over the lowland valleys in streaks, leaving certain regions uninjured at the border line where its intensity was dying out. In general, the cold air flowed down from the mountains toward San Francisco nearly parallel to the river valleys. Similar frosts occurred on the 30th in California and the 31st in Arizona. W. H. Hammon, forecast official at San Francisco, says that—

This frost was not unexpected, and warnings were sent throughout the State. The frost was the result of a cold wave which started from Montana and the Dakotas Sunday, March 10, and which, after sweeping the entire length of California, swung around through Arizona, New Mexico, and Texas. The progress of the cold weather has been carefully watched, and every locality has been warned of its approach.

MOISTURE.

The quantity of moisture in the atmosphere at any time may be expressed by means of the weight contained in a cubic foot of air, or by the tension or pressure of the vapor, or by the temperature of the dew-point. The mean dew-points for each station of the Weather Bureau, as deduced from observations made at 8 a. m. and 8 p. m., daily, are given in Table I.

The rate of evaporation from a special surface of water on muslin at any moment determines the temperature of the wet-bulb thermometer, but a properly constructed evaporimeter may be made to give the quantity of water evaporated from a similar surface during any interval of time. Such an evaporimeter, therefore, would sum up or integrate the effect of those influences that determine the temperature as given

by the wet bulb; from this evaporation the average humidity of the air during any given interval of time may be deduced.

It is much to be desired that one or more new series of measurements of evaporation, wind velocity, temperature, and dew-point be made at high and low stations in instrument shelters similar to those used by the Weather Bureau, in order that a general empirical formula may be devised for use with the evaporimeter considered as an integrating hygrometer.

The sensible temperature experienced by the human body and attributed to the atmosphere depends not merely upon the temperature of the air, but equally upon the dryness and the wind. It would seem that the rapid evaporation from the skin in dry, hot weather reduces the temperature of the layer of nerve cells at the surface of the body. This reduc-

tion, or sensible coolness, may be measured by the difference between the dry and wet bulb thermometers, in which case the resulting sensible temperatures are simply the temperatures of the wet-bulb thermometer as obtained by the whirling apparatus used in the shaded shelter, and correspond to the temperatures felt by persons standing in the shade of trees or houses, exposed to a natural breeze of at least 6 miles per hour. The temperature of the wet-bulb thermometer and

its depression below the dry bulb are the fundamental data for all investigations into the relation between human physiology and the atmosphere. In order to present a monthly summary of the atmospheric conditions from a hygienic and physiological point of view, Table VIII has been prepared, showing the maximum, minimum, and mean readings of the wet-bulb thermometer at 8 a. m. and 8 p. m., seventy-fifth meridian time.

PRECIPITATION.

[In inches and hundredths.]

The distribution of precipitation for the month of March, 1895, as determined by reports from about 2,500 stations, is exhibited on Chart III. The numerical details are given in Tables I, II, and III.

The precipitation for the current month was heaviest, 6 to 13 inches, on the coasts of Washington and Oregon, but least, averaging less than 0.5, from western Texas north to Manitoba and Saskatchewan.

The diurnal variation is shown by Table XII, which gives the total precipitation for each hour of seventy-fifth meridian time, as deduced from self-registering gauges kept at about 43 regular stations of the Weather Bureau; of these 37 are float gauges and 3 are weighing gauges.

The normal precipitation for each month is shown in the Atlas of Bulletin C, entitled "Rainfall and Snow of the United States, compiled to the End of 1891, with Annual, Seasonal, Monthly, and other Charts."

The current departures from the normal precipitation are given in Table I, which shows that precipitation was deficient over Canada, New England, the Atlantic coast north of Cape Hatteras, southern Florida, the greater part of Mississippi, Louisiana, Arizona, as also the northern part of the United States; it was generally in excess over the central portion of the United States. The large departures from the monthly normal were: excesses, Neah Bay, 5.0; Mobile, 3.1; deficits, Portland, Oreg., 3.2; Chatham, N. B., 3.1.

The average departure for each district is given in Table I. By dividing these by the respective normals for this month the following corresponding percentages are obtained (precipitation is in excess when the percentages of the normal exceeds 100):

Above the normal: South Atlantic, 122; Key West, 118; east Gulf, 115; west Gulf, 103; northern slope, 115; north Pacific, 107; south Pacific, 127.

Normal: Missouri Valley, 100.

Below the normal: New England, 81; south Atlantic, 77; Ohio Valley and Tennessee, 73; Lower Lake, 54; Upper Lake, 39; North Dakota, 19; Upper Mississippi, 59; middle slope, 78; Abilene (southern slope), 10; southern plateau, 27; middle plateau, 41; northern plateau, 75; middle Pacific, 66.

The years of greatest and least precipitation are given in the REVIEW for March, 1894. The precipitation for the current month was not the greatest on record at any regular station of the Weather Bureau, but it was the least on record at Moorhead, 0.03; Green Bay, 0.41; Kansas City, 0.95; Spokane, 0.57; Carson City, 0.41; Tucson, trace.

The total accumulated monthly departures from normal precipitation from the beginning of the year to the end of the current month are given in the second column of the following table; the third column gives the ratio of the current accumulated precipitation to its normal value.

Districts.	Accumulated departures.	Accumulated precipitation.	Districts.	Accumulated departures.	Accumulated precipitation.
	Inches.	Per cent.		Inches.	Per cent.
South Atlantic	+ 2.50	120	New England	- 3.90	89
Key West	+ 2.30	147	Middle Atlantic	- 1.90	83
Northern slope	+ 0.40	122	East Gulf	- 1.30	78
Middle slope	+ 0.20	105	West Gulf	- 2.50	78
South Pacific	+ 2.80	145	Ohio Valley and Tenn.	- 3.00	73
Middle plateau	0.00	100	Lower Lakes	- 2.60	66
Southern slope (Abilene) ..	0.00	100	Upper Lakes	- 1.70	39
			North Dakota	- 0.80	19
			Upper Mississippi	- 2.70	59
			Missouri Valley	- 1.20	73
			Southern plateau	- 0.40	27
			Northern plateau	- 1.80	75
			North Pacific	- 3.00	85
			Middle Pacific	- 0.60	66

Details as to excessive precipitation are given in Tables XIII and XIV.

The total snowfall at each station is given in Table II.

WIND.

LOCAL STORMS.

Destructive or severe local storms were reported as follows:

3d.—Augusta, Ga., tornado; funnel-shaped cloud.

7th.—Near Alco and Brewton, Ala., windstorms. Pensacola, Fla., thunderstorm.

8th.—Charlotte, N. C., and Knoxville, Tenn., windstorms. Nashville, Tenn., thunderstorm.

10th.—Meade, Kans., thunderstorm; several persons stunned.

13th.—Lindsey, Clayton, and Oneonto, Ala., windstorms. Oxford, La., thunderstorm.

14th.—Montgomery, Ala., thunderstorm. Oneonto, Ala., windstorm.

15th.—Parkersburg, W. Va., sleetstorm.

20th.—Columbus, Ga., rainstorm.

23d.—Hillsboro, Wis., windstorm.

24th.—Franklin, Ky., thunderstorm.

25th.—Altamont, N. Y., windstorm. Pittsburg, Pa., Delaware, Kilbourne, Milfordton, and New Moscow, Ohio, thunderstorms.

26th.—Muncie, Ind., windstorm.

27th.—Wheeling, W. Va., thunderstorm; horse killed by lightning.

28th.—New York, N. Y., windstorm.

30th.—McCune and Versailles, Mo., thunderstorms. Amarillo, Tex., windstorm and small whirlwind. Cheyenne, Wyo., and Denver, Colo., snowstorms.

31st.—Auburn, Nebr., thunderstorm.